Cartesian Coordinate System

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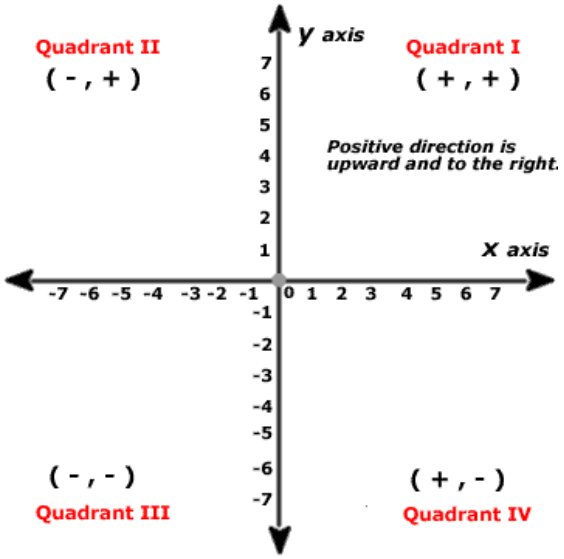
Ordered pair (x, y)



Plotting Data

A **scatter plot** is a plotting of the (x, y) data pairs on a Cartesian plane.

Ex.

Year	U.S. Exports (billions of dollars)
1996	56.8
1997	71.4
1998	78.8
1999	86.9
2000	111.3
2001	101.3
2002	97.5
2003	97.4

(draw graph here)

Absolute Value of a Real Number

The absolute value of a real number suggests its **magnitude** (size or distance from 0).

The **absolute value of a real number *a*** is:

$$|a| = \begin{cases} a, \text{ if } a > 0 \\ -a, \text{ if } a < 0. \\ 0, \text{ if } a = 0 \end{cases}$$

Properties of Absolute Value

Let *a* and *b* be real numbers.

1. $|a| \geq 0$ 2. $|-a| = |a|$ 3. $|ab| = |a||b|$ 4. $\left|\frac{a}{b}\right| = \frac{|a|}{|b|}$, $b \neq 0$

Distance Formula on a Number Line:

Let *a* and *b* be real numbers.

The distance between *a* and *b* is $|a-b|$. *Note $|a-b| = |b-a|$

Distance Formula in the Coordinate Plane:

The distance **d** between points $P(x_1, y_1)$ and $Q(x_2, y_2)$ in the coordinate plane is

d = $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

Midpoint Formula (number line):

The **midpoint of the line segment with endpoints *a* and *b*** is $\frac{a+b}{2}$.

Midpoint Formula (Coordinate Plane): The **midpoint of the line segment with endpoints (*a*, *b*) and (*c*, *d*)** is $\left(\frac{a+c}{2}, \frac{b+d}{2}\right)$.

Equations of a Circle

A **circle** is the set of points in a plane at a fixed distance (**radius**) from a fixed point (**center**).

Standard Form Equation of a Circle:

The **standard form equation of a circle** with center (*h*, *k*) and radius *r* is

$$(x-h)^2+(y-k)^2=r^2.$$

Ex. Find the standard form equation of the circle with center (-4, 1) and radius 8.

h = -4, *k* = 1 , and *r* = 8 so using the formula we have

$$(x-(-4))^2+(y-1)^2=8^2$$

$$(x+4)^2+(y-1)^2=64$$